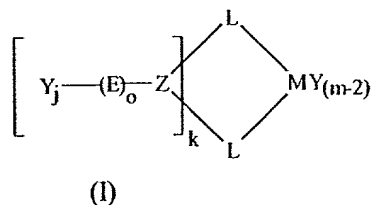


CLAIMS

1. A metallocene catalyst component for olefin polymerization comprising a metallocene compound characterized by the following formula:



wherein:

Y is halogen;

M is a transition metal of groups 3-6 of the periodic table;

each **L** is independently selected from a cyclopentadienyl-type unity, including indenyl or fluorenyl, substituted or not and the substituents being equal or different, united to **M** through a π bond;

Z is a group that forms a union bridge between the two unities **L**, which can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms;

E is a spacer group that unites **Z** and **Y** and can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms. It is characterized for having in its skeleton at least one silicon, germanium or tin atom, which the substituent **Y** is united to;

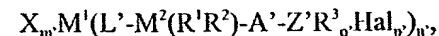
o is a number of value 0 or 1;

k is a number of value 1, 2 or 3;

m is a number equal to or higher than 2 and coinciding with the oxidation state of the transition metal;

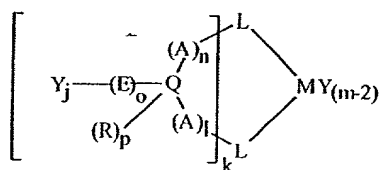
j is a number of value 0 or 1 with the condition that its value is 1 at least once; when **j** is 1 and **o** is 0, **Z** is characterized by having at least one silicon, germanium or tin atom which **Y** is directly united to;

with the proviso that the compound does not have general formula



wherein M^1 is a metal of group 4, 5 or 6 of the periodic table, each X is independently selected from hydrogen, halogen or a C_1 - C_{40} carbon-containing rest; m' is equal to 1, 2 or 3; n' is equal to 1 or 2; each L' is independently a π ligand, which coordinates to the central atom M^1 ; each M^2 is independently selected from silicon, germanium or tin; R^1 is a C_1 - C_{20} carbon-containing group; R^2 is a C_1 - C_{20} carbon-containing group or a π ligand, which coordinates to the central atom M^1 ; each A' is independently a divalent C_1 - C_{40} carbon-containing rest; each Z' is independently selected from boron, silicon, germanium or tin; each R^3 is independently selected from hydrogen or a C_1 - C_{20} carbon-containing rest; o' is equal to 0, 1 or 2; each Hal is independently selected from a halogen atom; p' is equal to 1, 2 or 3.

2. A catalyst component according to claim 1, characterized in that the metallocene compound has formula:



(II)

wherein:

Y is halogen;

M is a transition metal of groups 3, 4, 5 or 6 of the periodic table;

each L is independently selected from a cyclopentadienyl-type unity, including indenyl or fluorenyl, substituted or not and the substituents being equal or different, united to M through a π bond;

Q is an element of group 13, 14 or 15;

E is a spacer group that unites Q and Y and can have between 0 and 20 carbon atoms and between 0 and 5 oxygen, sulfur, nitrogen, phosphorus, silicon, germanium, tin or boron atoms and it is characterized by having in its skeleton at least one silicon, germanium or tin atom, which the substituent Y is united to;

R is an atom of hydrogen, halogen, halocarbon, substituted halocarbon, C_1 - C_{20} alkyl, C_2 - C_{20} alkenyl, C_6 - C_{20} aryl, C_7 - C_{40} alkylaryl, C_7 - C_{40} arylalkyl, C_8 - C_{20} arylalkenyl, alkoxy, siloxy and combinations thereof;

A, equal to or different from each other, is a bridge group between unities L and Q constituted either by only one divalent atom of group 16, preferably -O-, or by a trivalent monosubstituted element of group 15, preferably >N-R, R being defined above, or a tetravalent disubstituted element of group 14, preferably >C(R)₂ or >Si(R)₂, R being defined above, or by a chain of 2 or more atoms substituted or not, this chain being preferably of type -C-C-, -C-Si-, -Si-Si-, -Si-O-, -C-O-, -C-N-, -C-C-C-, -C-Si-C-, -Si-O-Si-;

o is a number of value 0 or 1;

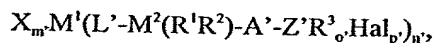
k is a number of value 1, 2 or 3;

m is a number equal to or higher than 2 and coinciding with the oxidation state of the transition metal;

p, n, l are numbers of value 0 or 1.

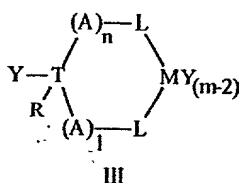
j is a number of value 0 or 1 with the condition that its value is 1 at least once; when J is 1 and o is 0, Q is a silicon, germanium or tin atom;

with the proviso that the compound does not have general formula



wherein M^I is a metal of group 4, 5 or 6 of the periodic table, each X is independently selected from hydrogen, halogen or a C₁-C₄₀ carbon-containing rest; m' is equal to 1, 2 or 3; n' is equal to 1 or 2; each L' is independently a π ligand, which coordinates to the central atom M^I; each M² is independently selected from silicon, germanium or tin; R¹ is a C₁-C₂₀ carbon-containing group; R² is a C₁-C₂₀ carbon-containing group or a π ligand, which coordinates to the central atom M^I; each A' is independently a divalent C₁-C₄₀ carbon-containing rest; each Z' is independently selected from boron, silicon, germanium or tin; each R³ is independently selected from hydrogen or a C₁-C₂₀ carbon-containing rest; o' is equal to 0, 1 or 2; each Hal is independently selected from a halogen atom; p' is equal to 1, 2 or 3.

3. A catalyst component according to claims 1-2, characterized in that the metallocene compound has formula:

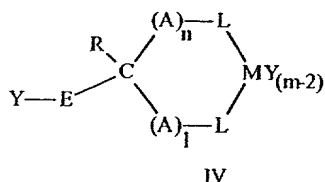


Wherein:

L, M, m, Y, R, l, n and A have already been defined;

T is selected from: silicon, germanium or tin.

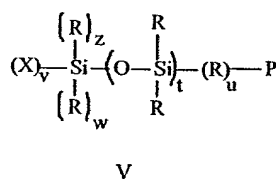
4. A catalyst component according to claims 1-2, characterized in that the metallocene compound has formula:



wherein:

L, M, m, Y, R, E, l, n and **A** have already been defined;

- 10 T is selected from: silicon, germanium or tin.
5. A heterogeneous catalyst component for the polymerization of olefins obtained from an inorganic solid that contains hydroxy groups and a catalyst component according to claims 1-4.
6. A heterogeneous catalyst component for the polymerization of olefins according to claim 5 consisting of: an inorganic solid that contains hydroxy groups and that has been previously
- 15 modified through reaction with a compound of formula:



20 being:

R: atom of hydrogen, halogen, halocarbon, substituted halocarbon, C₁₋₂₀ alkyl, C₂₋₂₀ alkenyl, C₆₋₂₀ aryl, C₇₋₄₀ alkylaryl, C₇₋₄₀ arylalkyl, C₈₋₂₀ arylalkenyl, alkoxy, siloxy and combinations thereof;

X: halogen or group OR⁴ wherein R⁴ has the same meaning given above;

P: NH₂, NHR, SH, OH or PHR;

- 25 $v+z+w=3$, v being different from 0;
 t and u are comprised between 0 and 10:

and a catalyst component according to claims 1-4.

7. A heterogeneous catalyst component for the polymerization of olefins according to claims 5-6 characterized in that the inorganic solid is selected from the group comprising: silica, silicates, carbonates, phosphates, clays, metal oxides and mixtures thereof.

8. A catalyst system comprising: a catalyst component according to claims 1-7 in combination with a cocatalyst selected from the group comprising: non-coordinating compounds of alumoxane-type, modified alumoxane-type, boron compounds and combinations thereof.
- 5 9. A catalyst system according to claim 8 characterized in that the cocatalyst is selected from the group comprising: methylalumoxane, dimethylaniline tetrakis(pentafluorophenyl)boron or trispentafluorophenylborane
- 10 10. A process for the preparation of the heterogeneous catalyst component characterized in that the compound of claims 1-4 and the inorganic support are put in contact by using tetrahydrofuran as solvent.
11. A process for the polymerization of alpha-olefins, optionally in combination with a cyclic olefin and/or a diene, characterized by the presence of a catalyst component according to claims 1-7.
12. A process according to claim 11 characterized in that the monomers are selected from the group comprising: ethylene, propene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-octene and mixtures thereof.
- 15 13. A process according to claim 11-12 for the copolymerization of ethylene in combination with a comonomer selected from the group comprising: propene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-octene, cyclic olefins and mixtures thereof.